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SPECIAL INFORMATION

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JUNE 1963

Soil Conservation

SOIL CONSERVATION SERVICE • U. S. DEPARTMENT OF AGRICULTURE

Soil Conservation
25 Years Ago

It's a spectacular scenery. Sightseers come hundreds of miles to look at it. But it's scenery that Stewart County (Ga.) could do better without. . . .

"The big gullies involve some 70,000 acres. And the giants grow fast and faster, as if stimulated by an overactive geologic gland. The lengthening process continues until the top of a ridge is reached. Highways are moved over and over again, and still they cannot get far enough out of the way. You can see the old roads of last year and the year before, where they run to meet a gully, pause for a jump of 15 or 20 yards, resume on the far side. . . .

"Here is one road in proximity to a gully head that looks as if it might not have to be shifted any more. That's because the Soil Conservation Service tried the expedient of a diversion ditch."

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COVER PICTURE.—Mile upon mile of conservation patterns unfold for today's air or land traveler across America—signposts to a fuller future for all.

Soil Conservation

ORVILLE L. FREEMAN
Secretary of Agriculture

DONALD A. WILLIAMS
Administrator, Soil Conservation Service

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FRANK B. HARPER, Editor

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Louisiana Bankers Travel Far To Study Conservation

By Leon Sisk

LOUISIANA bankers have found the first-hand study of conservation on the land so rewarding that they are entraining in July for their 9th conservation excursion into other States.

"The results have been far ahead of any thing dreamed of when the first tour was being planned in 1947," says President Richard S. Thompson of the Louisiana Association of Soil Conservation District Supervisors, who heads up this year's tour with President W. Richard White of the Louisiana Bankers Association, the two sponsoring organizations. "We get a lot of good, specific information about farming, and we get a lot of inspiration, too.

"Over the years, the visiting groups have learned secrets of successful farming out on the land from some of the best farmers in nearly three-fourths of the States in the Union. And Louisiana farmers have put what they learned on the tours into practice on their farms back home with the active encouragement and financial help of the Louisiana bankers. I believe that every phase of our agriculture has been improved."

It was in July 1947 that a special train carrying 147 bankers, soil conservation district supervisors, and just plain farmers moved out of its terminal in New Orleans bound for points in Texas, Oklahoma, Kansas, and Arkansas. On July 21 this year a diesel-powered train of modern sleeping cars will glide out of New Orleans' Union Station headed for Colorado, Wyoming, Iowa, Nebraska, and Illinois. On board will be 190 Louisiana bankers, farmers, and representatives of other groups, traveling at their own expense.

In the 16 years the equipment has changed; but the objective of the tour is still the same. It is to give the bankers and others an opportunity to rub shoulders with farmers in other States and see what they are doing to conserve their soil and water resources.

Big wheels on tour (l. to r.):—B. J. Glenwood, general passenger agent, Illinois Central RR; Pres. Richard Thompson, Louisiana Assn. SCD Supervisors; W. P. Sevier, Jr., past president, Louisiana Bankers Assn.; R. Irby Didier, Bankers Assn. executive vice president.

The idea for the tours originated with State Conservationist H. B. Martin of the Soil Conservation Service and R. Irby Didier, executive vice president of the Louisiana Bankers Association. W. T. Nolin of Hamburg, then president of the Louisiana Association of Soil Conservation District Supervisors, also had an active part in organizing the tour.

The original idea, in 1946, was for a group of representative bankers to tour the State to learn more about soil and water resources and farming operations on which sound bank loans might be based. But as the plan developed, it generated such widespread interest among bankers, SCD supervisors, and representatives of industrial and other groups that it had to be expanded from the outset.

By the time final arrangements were completed, the initial 1947 farmer-banker tour included leading Louisiana farmers, landowners, bankers, and civic and political figures. They traveled 1,000 miles in four States. That tour and the rest that followed have taken the bankers and others into 28 States and the District of Columbia. They have been as far as the West Coast, the Canadian border, New York City, and south Florida.

It is difficult to tell bankers from farmers in the group as they plod the fields by day and ride the train by night. Standard attire for all members is work clothes and a L-O-U-I-S-I-A-N-A cap. During the day they also meet and discuss mutual problems with outstanding men of similar interests in the host States. Back on the train, they relax and talk about what they saw on the farms they visited.

As a result of this procedure, farmers and bankers have learned together on these trips what makes western beef cattle well upholstered with steaks and roasts, what makes cows in the best dairying sections give good milk, and how good farming communities maintain and improve the productive capacity of their soil.

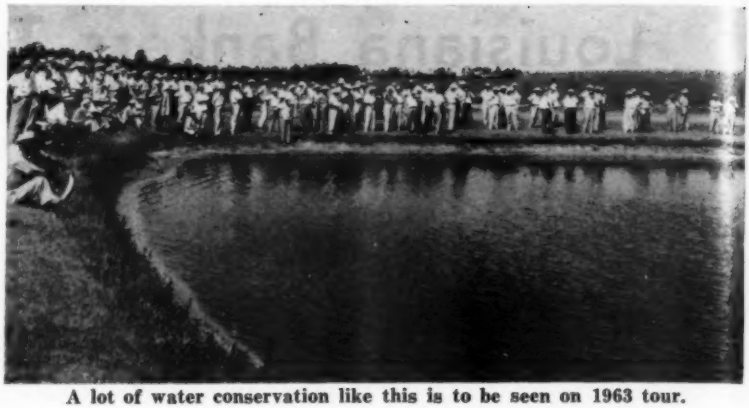
Didier believes that more than anything else the tour "has been the medium that brought Louisiana

The author is field information specialist, Soil Conservation Service, Spartanburg, S. C.

farmers, bankers, and business people together with a desire to resolve their mutual problems."

"After the depression, I couldn't quite understand the farmers' situation (and I was close to farming as operator of a small country bank in Avoyelles Parish)," he recalls. "By the same token, the farmers couldn't understand our position. The tour went a long way toward resolving that stalemate, by bringing farmers and bankers together and reestablishing the understanding that must exist between them. It has been a builder of good will as well as educational."

"This closer understanding among farmers and bankers of each other's problems that now obtains is a very fine thing," in the opinion of Marion Monk, formerly State president of the Louisiana Association and now president of the National Association of Soil and Water Conservation Districts, who has been on every tour since 1954. "Also, in my opinion it is a fine thing for our farmers to make these trips and see what the other farmers in another part of the Nation are doing. It gives them an opportunity to see things they need to put into practice on their land back home; and occasionally they see things that make them realize they are doing well."



A lot of water conservation like this is to be seen on 1963 tour.

One tangible result of the tours is the milkshed at Alexandria, a million-dollar operation that resulted directly from a visit in 1947 to the Sylvania Community in Arkansas, where 10 years before the farmers were trying unsuccessfully to grow cotton on eroded and worn out land. Then they switched to grass and dairying, and the community started prospering. A going dairy program now is in effect on family farms in central Louisiana. A rice-crawfish rotation system now being established in southwest Louisiana is similar to the fish-rice rotations also observed in Arkansas in 1957. Increased interest and activity in feeder lots and in irrigation have been observed since the Far West tour in 1959.

Still another benefit to the agriculture of Louisiana has been the introduction of Coastal bermudagrass, which was first seen at Tifton, Ga., in 1954. Today, some of the largest shipments of Coastal bermudagrass hay in the Nation come off farms in north and central Louisiana, where thousands of acres of this conservation and forage crop are being grown.

Didier points out that the tours also are doing a fine job of selling Louisiana to other parts of the country. They have been responsible for several out-of-State businesses' setting up in the State, he says, and they have interested people in many sections of the Nation in coming to Louisiana and making business contacts with banks, industry, and agriculture. Included are many from the West who have come to buy cattle since operators of feeder lots learned about the size and bone development which enables the Louisiana animals to put on more weight faster.

This year's tour leaves New Orleans Sunday, July 21. Monday morning the group detrains at Kankakee, Ill., and travels by bus to Chicago. Stops along the way will be made to study soils, crop rotations, water-management practices, drainage, grade control structures, grassed waterways, and other conservation measures.

The train that takes Louisiana bankers and farmers as far as Illinois on their 5-State conservation tour.

Next, the Louisianians will visit farms and farm machinery plants in the vicinity of Des Moines, Iowa. Wednesday will find them in the Sandhills of Nebraska, an area noted for its grass and cattle. Then in Wyoming they will visit a cattle ranch. Before leaving for home from Denver on Friday the 26th, they will study cattle feeding operations, irrigation farming, and farm and ranch operations carried out through the Great Plains Conservation Program in Colorado.

Conservation Plantings Protect-Beautify Roadsides

By J. E. Clay

MOTORISTS traveling State Highway No. 10 may rest their eyes on green young pine trees growing along 16 miles of roadside from the Kentucky line to the Trousdale County line in Tennessee.

The tree plantings are a product of an undertaking dating back to early 1961, when the board of supervisors, Macon County Soil Conservation District, planned a number of roadside beautification and stabilization projects along State highways. A. L. West, district engineer, Tennessee Highway Department, agreed to furnish labor and tools, and the district agreed to provide the materials.

The district bought 1,000 pine seedlings, which were set out on eroded areas along Highway No. 10. During the spring of 1961, 1,000 kudzu plants also were set out, on a steep road cut. In early 1962, the Tennessee Division of Forestry donated 5,000 pine seedlings to the district for additional roadside planting.

The Soil Conservation Service, meanwhile, furnished seed for trial plantings of crownvetch and kudzu. Daylily and iris bulbs also were planted on an eroded area along the highway. The district has fertilized the kudzu, sericea, and pine plantings.

This roadside conservation and beautification trial planting of crownvetch is 14 miles west of Lafayette on State Highway 52. (SCS Work Unit Conservationist J. E. Clay.)

The State Highway Department put up nine black and white metal signs at the planting sites in the fall of 1962. In addition to making the signs and supplying labor to make the plantings, the Department furnished a crew to clear out around the pine seedlings so they could be easily seen by highway maintenance crews during mowing and other operations.

As a result of this cooperative work in roadside protection and beautification, landowners have become more interested in making the roadbanks adjoining their property more attractive. Several farmers have seeded and mulched roadbanks and made plantings.

Still another boost to the district conservation program has been an increase in the number of pine seedlings ordered by farmers to set out on poor, eroded areas on their farms.

The cooperating agencies are determined to protect the 6,000 fragile young pines set out along State Highway 10 miles north of Lafayette, Tenn.

The author is work unit conservationist, Soil Conservation Service, Lafayette, Tenn.

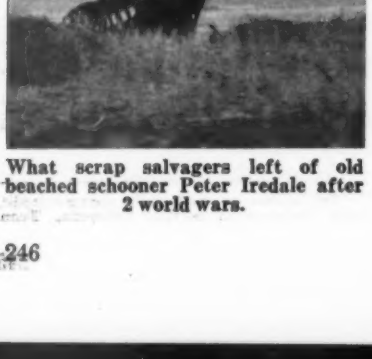
Dune Erosion Control—
BATTLE AGAINST THE SEA

By Robert F. Tegner

TOURISTS and summer residents who travel by automobile or bus to Oregon's coastal resort areas owe no small part of the recreational facilities they enjoy to more than a quarter of a century of concerted private and governmental efforts to hold back encroaching sands from the Pacific Ocean.

Sand dune erosion control, the conservationists call the protracted battle against wind and tides that long have rolled land-smothering sand in from the sea at vulnerable points on both the Pacific and the Atlantic coasts, as well as on the Gulf of Mexico and in some Great Lakes shore areas. The success of soil conservationists and foresters in this odds-on battle—in cooperation with farmers and other property owners and local government—has been notable on Oregon's historic upper coast.

The principal campaign in this area might be called "the battle of the Warrenton dunes." It was fought out along a 20-mile reach of sand-plagued shore extending southward from the mouth of the mighty Columbia River to Tillamook Head in northern Clatsop County. Captain William Clark of the famed (Meriwether) Lewis and Clark Expedition described this Clatsop Plains area they reached in 1805 as rolling grassland.



What scrap salvagers left of old beached schooner Peter Iredale after 2 world wars.

Travelers of U. S. Highway No. 101 to the historic port city of Astoria and county seat above the mouth of the Columbia, or to the resorts of Seaside or Cannon Beach, might think it always has remained so, when they go sightseeing into the oceanside dunes area and gaze over the expanse of grass, brush, and trees that now grow right down to the edge of the Pacific. But, to the contrary, the grass that grows abundantly now on the great foredune represents victory in the long battle of conservation and survival for the people on dune-threatened lands a mile or so inland.

Twenty-eight years ago, in fact, when this battle of the dunes was joined, the wreck of the four-masted schooner, the Peter Iredale, that ran aground there in 1906 and has remained a popular attraction for sightseers, was separated from any vegetation by bare, still-moving sand dunes. A plank road leading to the site was mostly covered by sand; and cattle paths were cut deep into the sand of older back dunes used as pasture.

The battle of the Warrenton dunes was begun by farmers, home and resort owners, and others of the area. County officials joined their ranks; and, in 1935, the Soil Conservation Service went into action with a company of Civilian Conservation Corps youths, headquartered at Warrenton, to plant beachgrass and set out trees and shrubs. Responsibility for the dunes stabilization work and its maintenance was taken over in 1941 by the newly formed Warrenton Dunes Soil Conservation District.

At the start, 3,000 acres of sand dunes were "on the move"—creeping onto pastures and forests, filling in lakes, and hindering navigation, both on smaller coastal streams and the Columbia River itself. The late Chief Hugh Bennet of the Soil Conservation Service estimated that forts, military reservations, roads, and private property valued at $22 million were menaced, and that the oncoming dunes were threatening to impede nearly $300 million worth of ocean-going commerce on the Columbia River. Landowners and county officials turned to the Federal Government for help.

When work was started in 1935,

Beach homes now can be built safely —with inviting scenery instead of bare dunes.

The author is field information specialist, Soil Conservation Service, Berkeley, Calif.

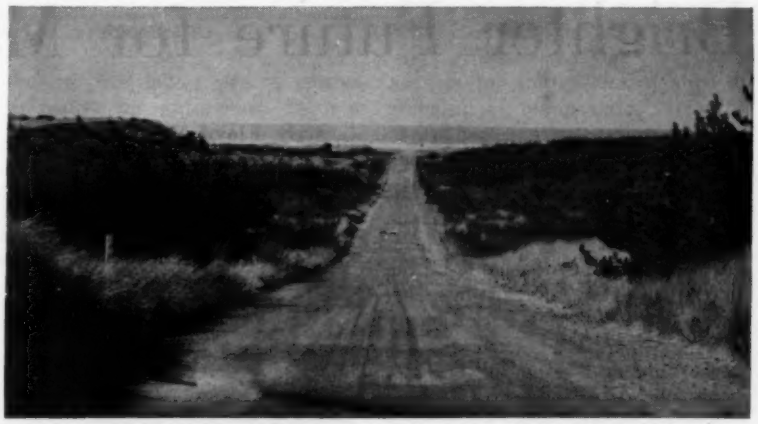
many plants and devices—like barriers of snow fence to hold back sand until the plants could establish themselves—were tried before the winning combinations were hit upon. European beachgrass proved to be the most successful in first stilling the sand, and a nursery was set up to propagate stock. Next came the woody plants—shrubs and trees—to further protect the unstable sand area. Scotch Broom and Shore Pine have proved most effective here. Indeed, pine has thrived so well that firebreaks have had to be cut at intervals as a safety measure.

Meanwhile, when the CCC Camp was closed early in World War II, landowners organized the Warrenton Dunes district to take over the work. The district, including 5,800 acres then, has been enlarged twice since and now includes 24,260 acres. The locally run district was in position to deal with the dune control problem on a long-time basis.

Because part of the cause of the erosion was overgrazing and trailing of cattle, and taking off native vegetation for buildings, roads, and other developments, some means was needed to protect against such encroachments in the future. Land use regulations and zoning of the area were voted by owner-cooperators in 1948. In one zone grazing, tillage, and construction of buildings were prohibited. In the other, grazing and tillage are prohibited, but building of homes and development of recreational facilities, with safeguarding limitations, are permitted.

There are other results which are less evident than the vegetation seen growing on the dunes, but which are just as real and important to the people of Clatsop County. For one thing, the tax base has been broadened. In 1945, to illustrate, Barney Lucas bought a strip of ocean frontage 10,000 feet long and 1,100 feet wide, developed building sites, and put in power and water and roads. With

ABOVE (1938):—Plank Sunset Beach road already protected from drifting sand as beachgrass was taking hold on adjacent dunes in 1938. BELOW (1963): —Today's surfaced road—1 mile west of 18-hole golf course flanking U. S. Highway 101 5 miles north of Seaside resort—crosses permanently vegetated and protected dune area.



Recreational development of Coffinbury Lake in Fort Stevens State Park to where it accommodated ⅛ million visitors in 1962 was made possible by work of Warrenton Dunes SCD.

technical help from the SCS, he carried out a stabilization and maintenance program. Many homes and $100,000 a year in additional taxes have resulted.

This is but one example of what the victory in dune control in Clatsop County has meant to the local economy and to tax coffers up the line. Other benefits include better protection of Columbia River shipping lanes; development of Fort Stevens State Park—which offers both salt and fresh water fishing and last year drew half a million visitors—and of a State game preserve. Also to be seen in the area is the site of Battery Russell, which was the target of offshore enemy shelling in World War II, and nearby Fort Clatsop, now a national memorial monument, which was a Lewis and Clark military post.

Important, too, has been the recovery of good agricultural land for the production of forage and other crops. Meanwhile, development of the Skipanon watershed protection and flood prevention project, sponsored by the Warrenton Dunes district and Clatsop County, is under way immediately to the east of the dunes area proper. It includes stream channel improvement and lake level control structural work.

A similar battle against sand dune encroachment is now going on farther south along the Oregon coast, at Florence. The experience at Warrenton is providing much help in containing this other sandy playground, which also threatens to engulf river and farmland.

New Aerial "Portrait" Helps Map Brighter Future for Maine County

By Floyd W. Campbell

MAINE'S York County has just had its picture taken again after 22 years. County leaders are glad they decided on the new photo-mapping sittings, because they show that York County still has plenty of resources worth conserving and using for brighter years ahead.

The up-to-date aerial mapping is part of a fight to speed up economic recovery. The goal is to reverse a trend that has included losses in textile-, shoe-, and machinery-making jobs in the past 2 decades, thousands of forest acres blackened by fires, family farms becoming marginal operations, and shore fisheries hit by water pollution.

Through their Commissioners, the 70,000 residents of the county caught the attention of the U. S. Department of Commerce. As a result, a Biddeford-Sanford Area Redevelopment Authority Committee was set up. It is headed by Lewis K. Marshall, a retired automotive engineer. Harold S. Brook

New aerial photo-map helps local residents like the Arthur Lougees (l.) obtain accurate information on their farm or other property.

of Maine's Department of Economic Development in Augusta represents the State's interests.

The ARA program included financial provisions for an aerial survey of the entire county. The Soil Conservation Service supervised the project.

York countians knew that changes had taken place since the earlier aerial maps were made, but now the 9″x9″ individual photoprints taken by the high-flying camera plane brought out the details. Interpreters in several technical agencies set to work itemizing the changes—the story of York's past and future written plainly in the county's soils and waters and captured on film.

"These new views will really give our work the gun," said Delbert L. Moody, the SCS consultant. "They'll help our work with hundreds of soil conservation district cooperators. We've had cases where, for example, old maps showed woodland; and we'd get over there onsite and find it had turned into a housing development. Another thing, the photos will vastly expedite our activities in flood prevention and watershed improvement. We can now pinpoint engineering locations and land-treatment needs."

The high-quality new photographs, showing recent road and

The author is State conservationist, Soil Conservation Service, Orono, Maine.

York County's new picture. SCS technician, pointing to timbered area that formerly was plowed land, finds new air photos speed conservation planning, because they are easier to read, more accurate.

housing developments, also help the soil scientists map faster and more accurately in the acre-by-acre soil survey under way in the county.

One of the liveliest phases of the aerial photos' usefulness has shown up in town planning. Several of the 22 York County towns which recognize that reexamining their resources is a first step to their economic improvement have purchased photo-prints for this purpose. Planners already have spotted scores of new sites for recreation, wildlife, and industrial and water-storage developments as expanded community features. ARA Committee Chairman Marshall estimates that the aerial survey pictures, which cost towns an average of $50 a set, thus have saved townships thousands of dollars apiece that might have been spent for special, individual mapping projects.

The camera flights eventually will play a large role in restoration of York County's woodland industry, in the opinion of Richard Arsenault of the Maine Forest Service.

"Now that we can see which way and just where our timber resources are going, we've gotten several firms interested in new wood-processing plant locations," he pointed out. "By putting the old and new shots side by side, we get an excellent evaluation of the extent of burned-over areas, types of trees and their growth, and a very accurate idea of how much replanting we're going to have to do."

A hopeful outlook by local farming experts also is confirmed in evidence collected by the camera eye in the sky: For example, there is splendid blueberry land in York, and berry production is coming up fast. York apple orchardists long have been recognized as the most successful in the State, but fruit-processing and marketing traditionally have been carried on elsewhere. New local processing plants, for which the photo-maps reveal plenty of suitable locations, would help absorb surplus labor. Couple them with wood-manufacturing enterprises, the local planners believe, and the soils and waters of this area truly would be harnessed to needs of the people.

York countians are taking other steps in their "operation bootstrap." Thus they have squads of alert citizens sounding out many aspects for improvement, such as retraining manpower, salvaging shore fisheries, attracting new industry, and putting all the pieces together as an overall economic development program. They also are inviting assistance through the teamwork of Federal and State agencies, such as that represented in the U.S. Department of Agriculture's Rural Areas Development Program.

This new industrial plant, expected to employ 600 people, is one of many projects aimed at attracting new business, industry, and agricultural development to the county.

Student Geographers-Farmers Study Conservation From the Air

By Benjamin F. Richason, Jr.

STUDENTS in the geography department of Carroll College at Waukesha, Wis., take to the air when they go on field trips.

Traveling in as many as half a dozen planes on a single flight, an average of almost 200 students a year have been taken on these field trips since they were started 5 years ago as a visual aid technique. More than 180 farmers have been conducted on similar tours to study soils, erosion, and conservation.

This unique pedagogical experiment was so successful that today aerial field trips are a regular part of the curriculum in earth science, geography of soils, geography of Wisconsin, aerial photo interpretation, and conservation of natural resources. The geography department cooperates with the Soil Conservation Service and the Waukesha County Agricultural Agent in conducting aerial trips for farmers, sportsmen, and professional conservationists.

The principal value of aerial field trips lies in the fact that altitude decreases the scale of the earth's surface, and, like a map, makes possible the immediate observation of large areas. Also, surface field observations that normally would require many hours, or even days, can be accomplished in much shorter time by plane.

Most of the Carroll College aerial trips last from 45 to 70 minutes at an estimated cost of $1 for 10 minutes of actual flight time. The conventional route, starting at Waukesha, loops some 80 miles through the Wales, Big Bend, Mukwonago, Eagle, Dousman, Chenequa, Sussex, and Lannon areas.

One of the most prominent features of the earth's surface as viewed from the air is the agricultural use of land. How man has used, or abused, the land is immediately apparent.

Surface water and drainage patterns are easily recognized, as are such evidences of erosion and sedimentation as the beginning of rills and gullies. Ground water characteristics and infiltration areas also may be observed.

Conservation patterns are particularly outstanding. Contour plowing and field strips, terraces and grassed waterways, shelterbelts and other tree plantings, farm ponds and wildlife areas, field ditches and tile lines which may be indistinct, or even unnoticed, at ground level—all become amazingly distinct when viewed from the air. From an airplane, they command attention that lectures and surface field trips fail to do.

Another prominent feature of the rural landscape as seen from the air is the pattern of soils, especially in the spring before crops cover the ground. The dark colored depression soils stand out in sharp contrast to the lighter colored upland soils. Soil amendment and conservation needs, as they are related to crop appearances, become apparent from the air as the growing season progresses, as do the effects of soil erosion on the height and color of crops. There is less variation in color and height of crops on lands with good manage-

Dr. Ben Richason (l.) holds a pre-flight briefing for each group before an aerial field trip. To accommodate large groups of students or farmers, flights may include as many as 6 airplanes.

The author is professor of geography, Carroll College, Waukesha, Wis.

ment practices such as stripcropping and contour plowing.

The aerial vantage view accordingly can aid in farm surveys, and in planning field patterns and crop rotations. Crops such as corn, small grains, pasture and meadows, woodlots, and orchards, in addition to crop diseases, can be identified from the airplane at low altitudes.

In planning an aerial field trip for students or farmers, the selection of the proper type of aircraft is important. A light, four-passenger airplane with the wing above is most practicable because of its maximum visibility, greater maneuverability, and slower speed. Flying at about 1,500 feet provides the best identification.

Because the aerial field trip participants will be viewing land features from a new perspective, a preflight briefing session is held. As it is not possible to have an instructor accompany each flight, a field trip brochure and flight map are distributed in advance to the flying students. It also has been found essential that the pilots be briefed so they can point out points of interest. Students are encouraged to take their cameras along on aerial field tours, in order to record more detail than can be obtained from aerial observations alone.

Post-flight interviews are illuminating in assessing the value of an aerial field trip as an instructional tool in geography and conservation. For example, one of the pilots who had flown the field trips many times said he had learned so much geography and conservation from the tours that he believed he could now "pass the professor's examinations."

SCS Work Unit Conservationist Charles W. Skaife reported receiving many requests for help in working out conservation farm plans following an aerial tour for farmers. He also found in such aerial observations a means of checking on the progress and maintenance of conservation programs. And Rolland Richards, farm management agent in Waukesha County, commented: "There is no better educational tool than the airplane to teach the cause, the effect, and the control of soil erosion, including water pollution and conservation practices."

Today, with the large number of available light airplanes, commercial pilots, and airports, aerial field trips may be made by anyone interested in the maximum observation and study of good land use and conservation practices. Many grade schools, high schools, and colleges, as well as adult groups, have followed the pattern set by Carroll College's geography department by inaugurating aerial field trips as an effective teaching device.

Conservation farming scenes like this one are duplicated many times over in Wisconsin's farming country for those who take to the air to study them.

Seeing and Reading About Conservation From the Air

Air travelers have a ringside seat for a spectacular show—a full sweep of the battle between conservation and waste being waged on the land below. They are witness to an ever unrolling panorama of conservation treated fields, farm ponds and watershed reservoirs, miles on end of tree windbreaks and farm woodlands, and lush pastures and rangelands dotted with cattle. Also sickly areas of eroding and wasting lands.

On one occasion a Soil Conservation Service employee, returning on Southern Airways to his Spartansburg, S. C., headquarters from a trip, was asked by the pilot, Capt. V. A. Knudegard, about the large number of farm ponds that could be seen from the air. Capt. Knudegard said he had counted more than 100 ponds during a 15-minute flight at 3,000 feet between Moultrie and Valdosta, Ga. The veteran pilot went on to say he would like to see the SCS prepare a booklet that would answer the questions travelers put to flight personnel about the jigsaw puzzle of conservation.

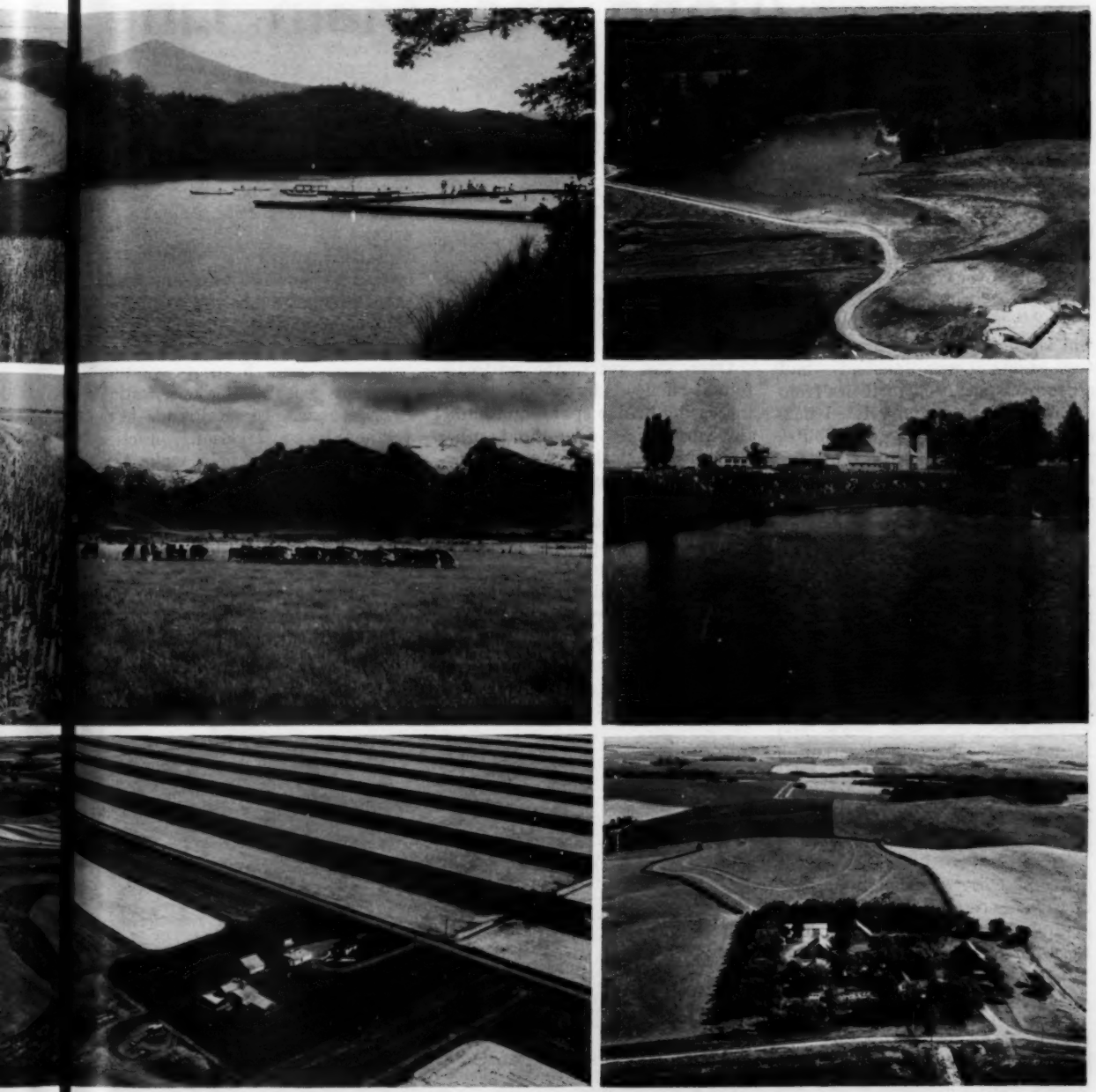
The upshot was "The Land Below Us," a 16-page illustrated publication designed to help air travelers interpret the dramatic story of what is happening to the land they are passing over. Two printings, totaling 10,000 copies, were used up in short order.

This interest in the unfolding scene below led to a second SCS bulletin in 1962, "That Land Down There," of which 310,000 copies have been printed.

America Te

Whether seen from the ground or the air—from the family car, bus, train, or plane—today's conservati lands Beautiful." New patterns on the land, shaped to Nature's likeness, give comforting assurance of the secu of th to r.—top):—Pa.—stripcropping; Wash.—contouring; Ga.—recreation; Ind.—watershed lake. (Center) Wis.— pond. (Bottom):—Mich.—conservation land use; Minn.—contour stripcropp Mo

Te Beautiful



nservati andscape of farms and watersheds across the country underscores the inviting image of "America the the secu of the Nation's productive soil and water resources as long as they are conserved and used wisely. (L. (Center) Wis.—tree windbreaks; Nebr.—contour bench leveling and irrigation; Nev.—good pasture; Md.—farm ripcropp Mont.—wind stripcropping; Iowa—terracing and multiflora rose border.

Soil and Water Conservation
Along the Main Line

By Herbert I. Jones

WHETHER they go overland by rail or highway or by air the Nation's travelers today are treated to the sight of an ever-broadening panorama of soil and water conservation measures spreading over farms and watersheds across the country.

This conservation work on land and streams helps in turn to protect rights-of-way, airfields, and other transportation facilities from erosion, flooding, and related hazards. And it thereby contributes to economy of operation by the carriers and to the safety, comfort, and enjoyment of the travelers.

Thus there are reasons enough why Americans on the move well may take a second look at such evidences of modern conservation planning and treatment as fields stripped with contour crop bands or terraces, thickly grassed pasture and range lands dotted with farm ponds or stockwater dams, tree windbreaks, alongside fields and farmsteads, floodwater-detention and recreational lakes or reservoirs on smaller streams threading the landscape, and other conservation measures.

For the railroad traveler—as for his counterpart journeying by bus or car—there is a significant story behind the scenes of conservation he sees from the window.

A hundred years ago, railroads were pushing westward in the wake of President Lincoln's signing of the first Pacific Railroad Act. Transportation and agriculture shared many common interests and problems during the century. As the railroads united West and East, hauling produce of the land to market, and returning with supplies and more people anxious to fashion a new country, there was a concern for the land and water.

Historically, the railroads suffered from floods. Roadbed, rolling stock, equipment, and freight often were lost. Sometimes lives were lost, too.

Over the years, the railroads fought off floods by raising grades, increasing bridge spans, and building protective dikes and other structures; but there was little opportunity until recent years to do work upstream away from the tracks, on the creek-size watersheds out of which most of the damaging floodwaters spilled as more and more timber and grasslands were cleared and plowed or too heavily used by livestock. Exposed to damage and delay, the railroads were in trouble at thousands of watershed crossings and wherever land use permitted problems to arise.

But today, at many of the same crossings, there is a different story, thanks in large measure to the development of soil and water conservation districts and watershed protection and flood prevention programs with Soil Conservation Service assistance. Railroads have furthered conservation practice over the years to help make this change possible. Their agricultural agents and livestock and development supervisors were ready to help, and recommended that their clientele work with soil conservation districts and watershed groups.

In some watershed projects

Railroaders, local citizens, and conservationists developing the White Clay-Brewery-Whiskey Creeks watershed project at Atchison, Kans., are seeking to prevent recurrence of scenes like this during the flood of 1958.

The author is field information specialist, Soil Conservation Service, Denver, Colo.

Views like this greet train travelers in the Tongue River small-watershed project area in northeastern North Dakota. The 125,000-cubic-yard earthfill Herzog Dam (foreground) is one of a series protecting 186 square miles of farmland served by the railroad.

where they derive direct benefits, railroads have played a major role by contributing financial aid, land, and services. In hundreds of other watersheds, railroads are gaining side benefits not anticipated during planning. The number of railroads affected by watershed conservation developments grows with nearly every plan reaching the construction stage. A few examples:

Passengers looking out windows of a main line Union Pacific Railroad train east of Topeka, Kans., may see only the broad productive bottom land cornfields; yet flooding of this land now is prevented by the Thompsonville watershed protection and flood prevention project work. Just out of sight are three dams and complete land treatment that together hold back or slow down excess runoff water. Farther upstream the Little Delaware-Mission Creeks and Nebo projects give added protection to this area.

Travelers on the Chicago, Rock Island, and Pacific Railroad get a close view of the Ramah Dam in Colorado's Big Sandy watershed project. This railroad provided land easements and maintenance money to further the work, which includes a 500-acre-foot recreation pool, along with its flood prevention features.

Seattle-bound vacationers can get a glimpse of the meadow-valley lands of the Lower Willow Creek watershed project as the Northern Pacific Railroad train slips past Drummond, Mont. These are the first fields in the Nation to be irrigated with stored water made available in a Public Law 566 small-watershed project.

In South Dakota, trains now pass safely over a trestle that was washed out five times in recent years. This is a benefit of the Silver Creek small-watershed project. On the Madden Arroyo watershed in Texas, Southern Pacific Railroad main lines were re-routed to allow construction of a principal dam and a more stable roadbed to assure passengers' greater safety and freight service no longer interrupted by washouts or high water. Thousands of people see this project work each week as they travel across the watershed area.

Conservation flood prevention work on Big Wewoka Creek in Oklahoma seeks to protect more than 50 railroad bridges and innumerable culverts crossed by the main-line trains between the head of the watershed and Wewoka Station. Floods on this creek cost seven lives and tied up trains for 2 weeks in 1945 alone.

The Chicago-Northwestern Railroad was an early participant in the Upper Salt-Swedeburg pilot watershed project in Nebraska. This is an outstanding example of effective conservation land treatment and upstream floodwater detention, with transportation carrier cooperation.

Two other types of conservation work catch the eye along railroad

Bench leveled irrigated fields (foreground), terraced dryland, a modern farmstead, and good windbreaks are close by the railroad tracks and highways in western Nebraska's Gering Valley watershed.

rights-of-way: One is wind erosion control—the strip crop patterns, tree windbreaks, and special sand dune stabilization work like that along the Atchison-Topeka and Santa Fe Railroad tracks near Lamar, Colo. Seen by hundreds of thousands of passengers, this work has been valued at more than $1 million by the road and technical people who had a part in it.

The second kind are the jobs that soil and water conservation districts and assisting Soil Conservation Service people also have done to regrade, regrass, and restore land to near its natural condition. An example is the view of the U.S. Air Force Academy grounds from the adjacent Denver and Rio Grande Western Railroad main line. A million visitors a year detrain and walk or drive into the Academy area, where they see what has been done with grass, trees, diversion terraces, water-control structures, and other land-treatment measures and construction.

Wherever people go today, whether by train or other means of transportation, there's a lesson to be learned from the stories on the land that have been put there by conservation-conscious farmers and ranchers and cooperating community, business, and other interests.

Watershed Project Brings Flood-Free Highway

By Gordon S. Smith

A FLOOD-FREE highway plus new recreation facilities and several hundred acres of improved farmland are among the community benefits packed into New Hampshire's 15-square-mile Oliverian Brook small-watershed project. The watershed protection and flood prevention project, in which the structural work has been completed, resulted from long-range planning by local people, augmented by State and Federal technical help and cost-sharing.

The Oliverian, in the northern part of the State, drains a 9,860-acre watershed above East Haverhill, a Grafton County village. Meandering out of the White Mountain National Forest, it falls over rocky ledges and flows through inviting trout pools and past fertile bottom land farms on its way to the Connecticut River. But in the past its peaceful waters too often turned to destructive floods when snows melted fast or a thunderstorm hit the area.

Farmers in the narrow valley bore the brunt of these floods for decades. Their fields were under water several times a year, and crop losses were ruining profits.

Farmland flooding wasn't the only problem. Each flood also swamped State Highway No. 25, vital link to other New England points, which ran through the valley. Local and interstate traffic had to detour 10 miles for days at a time; and continual road patching and backfilling ate up thousands of tax dollars and made driving hazardous.

In the search of relief, landowners turned to supervisors of the Grafton County Soil Conservation District. Their united efforts launched one of New England's first small-watershed projects. The Soil Conservation Service helped

Here is the completed Oliverian Brook watershed development, looking downstream from the new flood prevention dam (right foreground). New Highway No. 25 passes to left of dam.

The author is field information specialist, Soil Conservation Service, Upper Darby, Pa.

Route No. 25 was flooded frequently and in continuous need of repair before the watershed project gave it protection.

local people plan the project and supervised structural improvements, which the district will continue to operate and maintain.

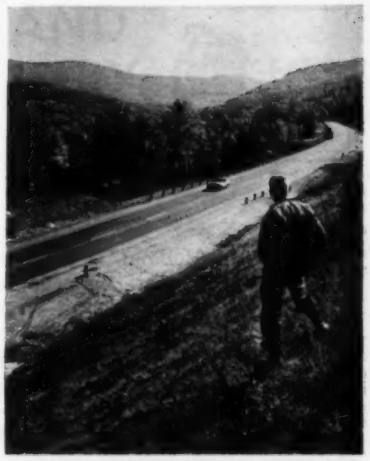
One is a floodwater-retarding dam in the upper half of the watershed, to hold back excess runoff from 70 percent of the watershed. The other is an improved stream channel at the lower end of the watershed, to keep water from gathering in the flat farmland area.

Upland conservation, an important factor in small-watershed planning, was good, with the Oliverian hills 94 percent tree-covered —7,000 acres in well-managed National Forest land and the rest in grassland and farm woodlots.

When SCS engineers found the only suitable site for the new dam passed directly across Route 25, New Hampshire's Department of Public Works and Highways relocated 2.8 miles of the road, and thereby turned an obstacle to advantage. Instead of hugging the stream, the new stretch climbed up and around the damsite.

New Hampshire Highway Department engineers figure a savings of $35,000 on highway construction costs because of the watershed project. The dam reduced the road flood hazard almost to zero.

The watershed dam proved its value when it was only 75 percent finished. When a typical spring deluge hit the area, 8 feet of potential floodwater backed up harmlessly behind the dam. Previously, there would have been another episode of 350 acres of flood-soaked farmland and highways awash. Three miles of channel improvement below the dam now gives added protection.



This is the new highway stretch close up. SCS technician Everett Henson checks roadbank stabilization grass seeding.

The watershed project offers multiple recreational returns. The Forest Service is enlarging a park in the newly protected area. Facilities for picnicking and camping will be more than doubled. The old roadbed, now passing underwater at the edge of the lake, will be the base for a ramp for rowboats and canoes. The new lake holds good promise for trout fishermen, and stream fishing will be better than ever. Waterfowl already are making use of the new habitat.

Flood-free Oliverian farmers report, meanwhile, that their hay crops have doubled. Land can be worked 2 to 3 weeks earlier than before, because equipment doesn't bog down in soggy fields. And daily milk deliveries are sure of getting to town on time over the new highway—no matter what the weather.

"Beyond all these local advantages," says SCS Technician Don Ferren, "this project has shown surrounding communities the advantages and benefits offered in watershed protection. Several applications for watershed projects already have stemmed from this project."

This flood plain grassland below the new dam is now protected from floods.

District Officer—Commercial Pilot

CAPTAIN Rolland L. Graves of Colorado is thought to be the only man in the Nation serving on a soil conservation district board who is also a commercial airline pilot. As a member of the district Board of Appeals, he serves as an auxiliary member of the board of supervisors.

He brings a world of experience to both his jobs. Graves has more than 20 years to his credit at the controls for Continental Airlines. Before that—boyhood on a Colorado farm, and years as flying instructor in Kansas and Wyoming.

It takes Graves 20 minutes to drive from his 80-acre irrigated farm to the Denver airport. And a jet trip may have him back home in 6 hours. When he leaves his crops and cattle, he may go to El Paso, Los Angeles, or Chicago; but wherever it is, he takes his lively interest in agriculture and curiosity about the land with him.

"One real kick I get out of flying," Graves says, "is seeing the changing land patterns, the farming plans developing each year, and the differences management and conservation make. The watershed work is a sight to see. I've watched the job on our Cherry Creek grow, and I'm proud to think my district has played a part."

In 1946 Graves bought his farm, installed wife Sandy and six children, rented an adjoining 240 acres, and settled down to a life of country living. But there were too many things to do to rest long. Fields needed leveling, irrigation ditches and water supplies required improvement, and new facilities had to be built. That's when Graves became a cooperator with the West Arapahoe Soil Conservation District—the step that led to his board duties 3 years ago.

Recently, Graves and the rest of the District people have faced up to the problem of metropolitan expansion. The Graves place and many other farms have changed

Capt. Rolland L. Graves.

from a strictly rural setting into a rurban complex, with all of its pressing land and water problems. The West Arapahoe district leaders are alert to these changes and are again revising their programs and plans, with the help of the Soil Conservation Service.

The district board and a special nonprofit educational corporation have created the Plains Conservation Center on three sections of prairie land owned by the district, and are sponsoring teachers' and students' scholarships to inform city people about farm and ranch problems and to develop conservation concepts among the 100,000 school-age youngsters in the area. The district board has hired its own educational leader to further these aims.

Crew members teaming up with Captain Graves on his flights are subjected to some conservation teaching by this unusual district official, while their passengers, in common with those of other air lines, may read about the conservation patterns below in the Soil Conservation Service publication, "That Land Down There," available on board.

Recalling his interest in historic pioneer trails, settlements, and mines, he points out the ease with which these can be identified from the air and how they can be interpreted in terms of land, soils, and water. He also likes to talk about the land-use patterns he sees from the air: Stubble mulching on grain lands, conservation range use in many areas and others that need regrassing, reservoirs when they are filling and the watershed snow pack, and communities which are using contouring, terracing, and strip farming. Also, the border diking and preirrigation in New Mexico, spring irrigation patterns in Nebraska, the encroaching wind erosion designs adjacent to blow fields, and the fantastic patterns of water erosion.

So it is that District Board Member Graves, who spends a good part of each week airborne, is able to sum up from the thousands of quick glances a commercial pilot takes along his route the needs for conservation and the healing and beautifying aspects of soil and water conservation on the land below.

—HERBERT I. JONES

BY ACCIDENT AND BY DESIGN

By William W. Nace

Foster Yost talks better about conservation when he takes you up in the barn overlooking the pond, farmstead, and contour strips beyond.—Missing is Mrs. Yost fishing from the boat!

ACCIDENT is a western Maryland town which owes its name to just that—an accident. An accident of early-day land settlement, that is.

The original grantee back in the 18th century may not have thought too highly of this mountain area's potential, but today's residents along the pleasant valley through which runs U. S. Highway 219 to connect the Pennsylvania Turnpike with the West Virginia mountain country find it increasingly rewarding in farming, recreation, and satisfying living far removed from urban sprawls and "strip cities." No accident is the impressive concentration of soil and water conservation measures that visitors and travelers on the highway see extending up the slopes both directions from the town of Accident.

Adding to Garrett County's rural beauty are the working patterns designed by farmers striving for better land use through conservation farming. The same patterns, visible for long distances from the ridges and valleys, extend for miles elsewhere over the county —between Oakland, the county seat, and popular Deep Creek Lake that backs up 30-odd miles behind a 90-foot-high dam as part of the Pittsburgh electric power system; southward along State Highway 560 running through Mountain Lake to Virginia; and northward from Oakland through the Little Youghiogheny River watershed, in which two watershed protection and flood prevention project dams have been completed so far. One may be seen from the highway 4 miles north of Oakland. The other completed flood-prevention-recreational reservoir comes to within a couple of hundred yards of the Baltimore and Ohio Railroad's St. Louis-Washington line about 6 miles east of Oakland at Deer Park and may be seen on the left from trains traveling west. Two others nearby will take shape this summer.

Accident inherited its name by a trick of fate almost 2 centuries ago. King George II, in 1751, granted 600 acres of colony land, to be located in the western part of the colony of Maryland, to a George Deakins in payment of a debt; but Deakins evidently didn't value his grant too highly and never attempted to stake out his claim.

After Deakins' son, William, inherited the unlocated land in 1774, however, he dispatched two survey parties to select his 600-acre tract. Neither group knew of the other. By chance, the second survey party came upon Deakins' first survey party. Comparing notes, orders, and reference marks, the two parties found they were on the same mission and had, by accident, marked the same area out of all that wilderness. The tract thus was patented, with the name "Accident," to William Deakins in

Contour stripcropping, farm ponds, improved grasslands and woodlands form this striking aerial pattern of conservation land use on at least 16 farms around Accident, Md., (upper left).

The author is work unit conservationist, Soil Conservation Service, Oakland, Md.

August 1774.

Ensuing generations of timber clearing and farming brought their soil erosion and related problems. By World War II they were bad. One farmer and community leader, Foster Yost of Accident, is credited with having been largely responsible for the change from old-fashioned, soil-wasting farming in the valley; but when the Soil Conservation Service recommended contour stripcropping to help tie down the soil, even he was not convinced that anything but straight rows would be practical.

It was arranged for Mr. Yost and a carload of his neighbors to visit conservation farms in Frederick County, Md., to see contour strips and talk with farmers who used them. Yost returned home convinced. He plowed his cropland in contour strips that spring and built two long diversions to help carry excess rainwater off of his cropland.

Yost's reputation as a good farmer likewise convinced his neighbors that these new farming ideas were sound. They soon followed his example. Yost became a supervisor of the Garrett County Soil Conservation District when it was formed by landowners in 1943, and served as chairman from 1945 to 1960.

Today, Accident is a thriving dairy and beef cattle center, which relies heavily on soil and water-saving practices to keep it so. Farm ponds dot the land. One large community pond supplies emergency water for the local volunteer fire company and recreation for the village. Also attesting to the progress of conservation farming in this locality of generally small nonwoodland farming operations are the several hundred acres of contour strips, diversions that carry water safely off hillside fields, and steep land now protected by trees.

Driving past the sales barn on Route 219 just below Accident during a regular Monday auction, which draws livestock buyers from a distance, any passerby can see that farming in Accident is a good business—and it's not by accident!

From Watershed Dam To "Country Club"

By Raymond C. McBay

A recreational area on the D. E. Billups farm near Van Alstyne, Tex., is a working example of turning a watershed protection and flood prevention development into a supplemental community asset.

The now popular Mantua Country Club was built at one of the 253 floodwater-retarding structures planned by the Soil Conservation Service for construction in the Collin Soil Conservation District, as part of the Trinity River watershed in Collin, Fannin, and Grayson counties. Plans for the recreational facilities were started upon completion of the 29-acre lake, with Federal technical and finanical assistance, in October 1958.

Billups designated 8 acres of waterfront land solely for the purpose of recreation. This area is used for picnicking, camping, volleyball, softball, and croquet. The lake supplies fishing, boating, skiing, and swimming.

Watershed dam that forms lake.

With the cooperation of the Grayson-Collin Electric Cooperative, foundation poles were installed for a 200-foot fishing pier and a diving platform in the swimming area. Seventeen floodlights were mounted on discarded poles, to light the swimming, camping, fishing, picnic, and croquet court areas.

A club house and concession stand was built in 1962 and is available for special gatherings and parties, for a small rental fee. Several tables and barbecue grills also are available for picnicking and camping. Water supply for the recreation area is supplied by a fresh-water well. Two rafts were placed in the roped-off swimming area. For the fishermen, a barge powered by a 15 hp motor accommodates 10 to 15 adults. Swinging bridges across the prongs of the lake give access to more shoreline.

"The cost of all existing facilities is about $1,500," Billups said, pointing out that low cost was made possible by the help and

Note:—The author is work unit conservationist, Soil Conservation Service, Van Alstyne, Tex.

Entrance to Mantua Country Club lake with some of recreation facilities in background.

cooperation of others. Improvements and maintenance are financed by annual membership dues.

Twelve to fifteen hundred people are now enjoying the recreational facilities at this lake each year. Annual family memberships exceed 100. Members come from all surrounding towns, including the City of Dallas, Richardson, Plano, Garland, McKinney, Celina, Allen, and Van Alystyne. Honorary memberships are presented to ministers of all churches, and the facilities also are made available to other nonprofit organizations such as Boy Scouts, Girl Scouts, 4-H Clubs, and others seeking outdoor recreation and training.

Billups said that future membership dues will be used to improve the area further. Some of the improvements planned include the control of undesirable water plants, cleaning of the shoreline, and the building of minnow ponds to provide bait for the fishermen.

200-foot pier makes fishing easier in the Billups lake.

Conservation Air Tour Draws Arkansas Visitors

Nineteen sixty-three marks the sixth year that supervisors of the Jefferson County (Ark.) Soil Conservation District have sponsored an annual conservation air tour.

About 150 people from Pine Bluff and the surrounding area go on the tour, first held in 1958. Flights leave the airport every 30 minutes from 9 a.m. to 4 p.m. Four-place planes, flown by experienced local pilots, are used. For $3 each, people are taken on a 60-mile tour "as the crow flies," and given a bird's-eye view of conservation practices being carried out by Jefferson County SCD cooperators. About 15 points of interest are marked by squares of heavy white paper easily seen from the air. In addition, each individual receives an illustrated folder showing the route to be flown and identifying and describing the practices to be seen.

Besides local people, visitors from all over Arkansas have made the tour.

Have You Seen?---

● "Outdoor Recreation on the Nation's Farmland," published by the U.S.D.A. Office of Information as Picture Story 140. Mostly by pictures, this pamphlet shows how many farmers and other landowners already have found recreation to be a new and profitable "farm crop."

Soil Surveys Help Engineers Build Better Roads at Lower Cost

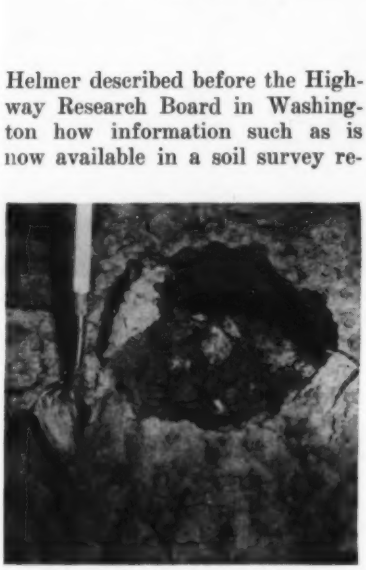
By Louis E. Derr

SKILLS of the soil scientists are figuring more and more in the decisions of the engineers who route or design and build modern highway systems. Substantial savings in construction costs and greater durability of the roads are among the measurable benefits.

In Oklahoma, to illustrate, the use of information contained in present published soil surveys is regarded by highway engineers as a prerequisite to beginning each new job. For one thing, the soil surveys published by the Soil Conservation Service in Oklahoma, as in other States, have engineering sections which have been prepared with the cooperation of the Oklahoma Highway Department and checked, on a selected sample basis, in the laboratories of the U. S. Bureau of Public Roads in Washington. The soils of 30 Oklahoma counties, representing more than half the State's area, have been surveyed by the SCS in cooperation with the State Experiment Station and survey maps useful to the highway builders published.

This progress may be credited mainly to the efforts of R. A. Helmer, research engineer for the Oklahoma Highway Department. For years he has maintained among his contemporaries that soils information, as provided by the soil survey, is fundamental in the routing and building of highways that are to perform satisfactorily and endure.

On one occasion, for example, Helmer described before the Highway Research Board in Washington how information such as is now available in a soil survey report could have meant a $600,000 saving in the paving cost alone of U. S. Highway 70 in southern Oklahoma. The highway crossing Choctaw County is routed over stretches of clay soils which have a high "shrink-swell" characteristic. Paving on this type of soil presents problems well known to the highway engineer.



Cave-ins like this on unstable soil are caused when oversaturated soil underneath is tunneled away. This action results in damage to highways unless excess water is piped out.

Soil profile of Parsons silt loam in Oklahoma showing heavy clay subsoil (bottom) that shrinks and swells and causes pavement damage.

A 13-mile stretch of Highway 70 is on sandy loam soils. It takes an average of 15 inches of base and subbase for a highway on such soils, according to engineers' calculations. The remaining 32 miles of the road is on plastic clay soils, which require an average of 26 inches of base and subbase, 11 inches more than on the sandy soils. The county soil survey, made years after Highway 70 was built, showed that routing the highway not more than 1 mile away would have skirted the clay soils and would have placed it on the more stable sandy loam.

"By 1950 prices, an inch of paving cost about $1,800 a mile," Helmer pointed out. "Eleven times $1,800, for the 32 miles of Highway 70 built on the clay soils, figures out to be more than $600,000."

Through Helmer's efforts, available soils information has been prepared and systematized for the use of the engineers and others confronted by problems of excavation and foundation.

Another useful source of soils information for the State's highway builders is the "strip surveys" being prepared by the SCS soil scientists through agreement with the Oklahoma Highway Depart-

The author is State soil scientist, Soil Conservation Service, Stillwater, Okla.

ment. These surveys, in more than usual detail, are made along the routes of present roads to provide information essential in the development of new highways. The functioning of the present roads in the light of the soils information is subjected to intensive research.

Oklahoma's broad surface has many areas in which the work of the soil scientists, in field and laboratory, can mean much in time and expense saved by the engineering profession. And in another 6 years, according to the schedule of the soil survey in Oklahoma, the soils of the entire State will have been mapped and the information made available to all who have need of it.

Roadside erosion control like this in Texas also prolongs highway life, protects adjacent farmland, and contributes to safe travel by automobile, bus, or truck.

Audubon Classes Travel To Conservation-Nature Areas

By Georgie A. Keller

AS urbanization encroaches more and more on agricultural and natural areas and urban areas continue to spread city people are finding it harder to reach open countryside where they can study and enjoy conservation and natural history at first hand.

To help meet this challenge, the Audubon Society of the Central Atlantic States, Inc., through the U. S. Department of Agriculture's Graduate School, conducts a 2-year series of adult courses that provide an understanding of the ecology of this region. The main idea behind the courses is to get the students out in the field and on the land.

All-day and overnight trips are conducted by specialists of the Soil Conservation Service, U. S. Geological Survey, U. S. Weather Bureau, and Bureau of Sport Fisheries and Wildlife, and by university and high school teachers. Students and instructors travel over main highways and country roads to the natural regions in Maryland and Virginia. En route, they observe conservation land-treatment measures and visit and study the natural history areas.

An elementary course for those with little outdoor experience introduces them to the out of doors, with the option of making overnight camping trips. For example, after being exposed to the rudiments of practical dress and equipment for outdoor life, and to the many reference books and field

Soil and water conservation scenes like this one hold a particular interest for the traveling students.

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identification guides, car caravans of students and teachers leave Washington for the Cedarville State Forest in Maryland, off of U. S. Highway 301. There they study the geologic formation, the trees and other vegetation, and wildlife. They are shown the A. B, and C horizons of a soil profile exposed along one of the trails, and abandoned farmland that is reverting to forest land because it is in the area of the podzolic soil group.

Another day, the caravan swings along State Highway 416 and stops near the intersection of State Highway 4 to visit the Patuxent River marsh. The students examine the wild rice growing in the fresh tidal river part of the marsh, note the transition from cattails and reedgrass to the big cordgrass in the brackish tidal river section, and identify acquatic plants common to both.

In addition to having esthetic value, marshlands yield commercial products such as furs, wildrice, peat, rushes, and hay. In fact, Soil Conservation Service biologists say proper marsh management is becoming more and more urgent for continued production of fur-bearers and waterfowl. Practices used in SCS planning for marsh management include controlled burning and water leveling.

Visiting the uplands en route to the Catoctin Mountain Park near Thurmont, Md., the Audubon Society students observe many examples of improved pastures, grassed waterways, contour stripcropping, and other soil and water conservation along Interstate Highway 70 (U. S. Highway 240) and U. S. Highway 15 and State Highway 77. On another trip, the caravan takes U. S. 50 and State Highways 16 and 335 to the Blackwater National Wildlife Refuge near Cambridge, Md. There the students see fresh-water impoundments and land between them producing food crops for the wildlife that abounds in the refuge.

A few of the Audubon students take a break on field trip.

An SCS trial planting of American beachgrass.

One of the most productive trips of all is the overnight journey to Ocean City, Md. Here the students study beach erosion, accentuated by the damaging March 1962 storms; see dunes in the slow process of stabilization by native beachgrasses; and examine marine life cast up by the ocean. The SCS, in the meantime, has made trial plantings of both European and improved strains of American beachgrass in the Ocean City-Rehobeth Beach (Del.) area; and supplies of the superior American species for general planting now are being produced by growers from initial stocks made available to soil conservation districts by the SCS Plant Materials Center at Beltsville, Md.

At a nearby salt marsh, the traveling students also study the transition zones from upland vegetation, to shallow-water vegetation, to deeper water vegetation.

Thus the natural history field school covers representative examples of all the major ecological comunities in the Central Atlantic region, and gives its particippants from the city an otherwise hard-to-come-by opportunity for learning to understand more about conservation and natural history.